

PRODUCT DATA SHEET

DESCRIPTION

Toray Cetex® TC1225 is a high-end thermoplastic composite material, utilizing a semi-crystalline engineered PAEK resin for excellent mechanical performance. The distinctive value of Toray Cetex® TC1225 over other composites with a PAEK family matrix is its superior processability due to a low melt viscosity and reduction in processing temperature by 50–75°C (122–167°F)*. Toray Cetex® TC1225 doesn't only yield a high-quality product used in ATL/AFP processes, it speeds up cycle times enabling cost-efficient production in all available formats.

Additionally, Toray Cetex® TC1225 is an ideal composite to be overmolded with neat or short fiber reinforced PEEK resin, creating a very strong bond. Overmolding, integrating continuous fiber reinforced composites in an injection molding process, combines the strength of high-end composites with the design freedom and complexity of injection molding parts.

Toray Cetex® TC1225 is available as a UD tape, a fabric prepreg, and as reinforced thermoplastic laminates (RTLs) of varying thicknesses. RTLs can be equipped with lightning strike protection, and carbon reinforced RTLs can be supplied with a thin glass top layer to protect a partly metallic assembly against galvanic corrosion. Glass scrim is also applicable in structures made from UD tape.

*Standard PEEK processes at temperatures up to 400°C (752°F)

FEATURES

- ▶ Superior processability as a result of low melt viscosity and relatively low processing
- ▶ Form freedom—suited for overmolding with neat or short fiber reinforced PEEK
- ▶ Relatively low processing temperature enables shorter cycle times and less energy consumption
- ▶ Excellent mechanical performance, also at elevated temperatures
- ▶ Excellent toughness and Compression After Impact (CAI) resistance of 314 MPa (45.6 ksi)
- ▶ Very low moisture absorption
- ▶ Outstanding chemical and solvent resistance
- ▶ Indefinite shelf life at ambient temperature storage
- ▶ Excellent FST performance

PRODUCT TYPE

Engineered PAEK (PolyArylEtherKetone) Thermoplastic Resin System

TYPICAL APPLICATIONS

- ▶ Primary and secondary aircraft structures
- ▶ High load aircraft interiors applications
- ▶ Access panels, rib stiffeners, brackets
- ▶ Medical
- ▶ Oil and gas

TYPICAL NEAT RESIN PROPERTIES

| | |
|-----------------------------------|---|
| Density (specific gravity) | 1.30 g/cm ³ (81.2 lb/ft ³) |
| T _g (glass transition) | 147°C (297°F) |
| T _m (melt) | 305°C (581°F) |
| T _c (crystallinity) | 263°C (505°F) |
| T _p (processing) | 320–380°C (608–720°F) |

SHELF LIFE

| | |
|-----------------------------|--|
| Out Life: | Indefinite at ambient temperature storage |
| Frozen Storage Life: | Not applicable—product does not require freezing |



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PHYSICAL PROPERTIES

| Property | Standard Modulus Carbon UD Tape | 5 Harness Satin (T300JB Carbon Woven Prepreg) | 8 Harness Satin (EC9 Glass Woven Prepreg) |
|----------------------------------|---|--|---|
| Fiber areal weight (FAW) | 145 g/m ² (4.28 oz/yd ²) | 280 g/m ² (8.26 oz/yd ²) | 300 g/m ² (8.85 oz/yd ²) |
| Weight per ply (PAW) | 221 g/m ² (6.52 oz/yd ²) | 489 g/m ² (14.42 oz/yd ²) | 454g/m ² (13.39 oz/yd ²) |
| Resin content by weight (RC) | 34% | 42% | 34% |
| Consolidated ply thickness (CPT) | 0.14 mm (0.0054") | 0.31 mm (0.0122") | 0.24 mm (0.009") |
| Density | 1.59 g/cm ³ (99.3 lb/ft ³) | 1.53 g/cm ³ (95.51 lb/ft ³) | 1.92 g/cm ³ (119.8 lbs/ft ³) |

MECHANICAL PROPERTIES

| Standard Modulus Carbon 145gsm UD Tape 34% RC | | | | |
|--|-----------|-------------|-----------------------|----------------------------|
| Property | Condition | Test Method | Results | |
| Tensile Strength 0° | RTD | ASTM D 3039 | 2410 MPa | 350 ksi |
| Tensile Modulus 0° | RTD | ASTM D 3039 | 135 GPa | 19.5 Msi |
| Tensile Strength 90° | RTD | ASTM D 3039 | 86 MPa | 12.5 ksi |
| Tensile Modulus 90° | RTD | ASTM D 3039 | 10 GPa | 1.4 Msi |
| Compression Strength 0° | RTD | ASTM D 6641 | 1300 MPa | 189 ksi |
| Compression Modulus 0° | RTD | ASTM D 6641 | 124 GPa | 18 Msi |
| In-Plane Shear Strength | RTD | ASTM D 3518 | 152 MPa | 22 ksi |
| In-Plane Shear Strength 2% Offset | RTD | ASTM D 3518 | 42.0 MPa | 6.1 ksi |
| In-Plane Shear Modulus | RTD | ASTM D 3518 | 4.3 GPa | 0.62 Msi |
| Flexural Strength 90° | RTD | ASTM D 790 | 152 MPa | 22 ksi |
| Interlaminar Shear Strength (SBS) 0°/90° | RTD | ASTM D 2344 | 96.5 MPa | 14 ksi |
| Open-Hole Tensile Strength | RTD | ASTM D 5766 | 448 MPa | 65 ksi |
| Open-Hole Tensile Strength | CTD | ASTM D 5766 | 448 MPa | 65 ksi |
| Open-Hole Compression Strength | RTD | ASTM D 6484 | 310 MPa | 45 ksi |
| Open-Hole Compression Strength | ETD | ASTM D 6484 | 262 MPa | 38 ksi |
| Compression After Impact Strength 30.5 J (270 in/lb) Impact Energy | RTD | ASTM D 7137 | 310 MPa | 45 ksi |
| Mode I Interlaminar Fracture Toughness (G _{IC} Strain Energy Release Rate) | RTD | ASTM D 5528 | 2.1 kJ/m ² | 12.0 in-lb/in ² |
| Mode II Interlaminar Fracture Toughness (G _{IIc} Strain Energy Release Rate) | RTD | ASTM D 7905 | 2.6 kJ/m ² | 15.0 in-lb/in ² |

CTD is 18°C (65°F)
ETD is 121°C (250°F)

PRODUCT DATA SHEET

| Intermediate Modulus Carbon 145gsm FAW UD Tape Laminate 34% RC | | | | |
|---|-----------|-------------|----------|----------|
| Property | Condition | Test Method | Results | |
| Tensile Strength 0° | RTD | ASTM D 3039 | 3100 MPa | 450 ksi |
| Tensile Modulus 0° | RTD | ASTM D 3039 | 159 GPa | 23 Msi |
| Tensile Strength 90° | RTD | ASTM D3039 | 86 MPa | 12.5 ksi |
| Tensile Modulus 90° | RTD | ASTM D 3039 | 10 GPa | 1.5 Msi |
| Compressive Strength 0° | RTD | ASTM D 6641 | 1300 MPa | 189 ksi |
| Compressive Modulus 0° | RTD | ASTM D 6641 | 138 GPa | 20 ksi |
| Flexural Strength 90° | RTD | ASTM D 7264 | 162 MPa | 23.5 ksi |
| Interlaminar Shear Strength (SBS) 0°/ 90° | RTD | ASTM D 2344 | 96.5 MPa | 14 ksi |
| Open-Hole Tensile Strength | RTD | ASTM D 5766 | 655 MPa | 95 ksi |
| Open-Hole Compressive Strength | RTD | ASTM D 6484 | 303 MPa | 44 ksi |
| Compression After Impact Strength 30.5 J (270 in/lb) Impact Energy | RTD | ASTM D 7137 | 338 MPa | 49 ksi |
| Fiber type IM7 | | | | |

PRODUCT DATA SHEET

| High Strength T300JB 3K Carbon 280gsm 5HS Woven Fabric Reinforced Laminate 42% RC | | | | |
|--|-----------|---------------|-----------------------|----------------------------|
| Property | Condition | Methods | Results | |
| Tensile Strength 0° | RTD | EN 2597B | 805 MPa | 117 ksi |
| Tensile Modulus 0° | RTD | EN 2597B | 58 GPa | 8.45 Msi |
| Tensile Strength 90° | RTD | EN 2597B | 739 MPa | 107 ksi |
| Tensile Modulus 90° | RTD | EN 2597B | 59 GPa | 8.56 Msi |
| In-Plane Shear Strength | RTD | ASTM D3518 | 147 MPa | 21.3 ksi |
| In-Plane Shear Modulus | RTD | ASTM D3518 | 4.1 GPa | 0.59 Msi |
| Compression Strength 0° | RTD | ASTM D6641 | 628 MPa | 91.1 ksi |
| Compression Modulus 0° | RTD | ASTM D6641 | 52 GPa | 7.61 Msi |
| Compression Strength 90° | RTD | ASTM D6641 | 676 MPa | 98.1 ksi |
| Compression Modulus 90° | RTD | ASTM D6641 | 53 GPa | 7.62 Msi |
| Flexural Strength 0° | RTD | EN 2562A | 1040 MPa | 151 ksi |
| Flexural Modulus 0° | RTD | EN 2562A | 60 GPa | 8.76 Msi |
| Flexural Strength 90° | RTD | EN 2562A | 879 MPa | 127 ksi |
| Flexural Modulus 90° | RTD | EN 2562A | 48 GPa | 6.95 Msi |
| Compression After Impact Strength 30 J (266 in/lb) Impact Energy | RTD | ASTM D7137-12 | 314 MPa | 45.6 ksi |
| Mode I Interlaminar Fracture Toughness (G _{IC} Strain Energy Release Rate) | RTD | ASTM D5528 | 2249 J/m ² | 12.8 in-lb/in ² |

50% fiber by volume (V_f)
The mechanical data provided are average values from a limited dataset. For additional data please contact Toray Advanced Composites.

HEALTH & SAFETY

Health and safety information on handling and processing Toray composite materials is described in the Safety Data Sheet available from Toray Advanced Composites. To obtain this or any other information about Toray Cetex® PAEK thermoplastic composite materials, contact Toray Advanced Composites.

Revised 07/2019

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